

**COMPACT KEYPAD MOUSE**

**BACKGROUND**

[1001] The present disclosure generally relates to a  
5 computer input device, and more specifically, to a mouse or  
mouse-like device.

[1002] A mouse is a widely-used computer input device,  
which has become greatly accepted among computer users. A  
mouse comprises essentially of a housing which can be slid  
10 by a single hand over a flat surface to generate signals in  
response to the relative motion of the housing over the  
flat surface. These signals are produced by a transducer  
or optical generator typically located on the bottom of the  
housing and are transmitted to a computer via communication  
15 means (e.g., a cable connected to a computer's input port).  
The signals represent orthogonal incremental motion  
components of the mouse in the x and y directions over the  
flat surface.

[1003] Generally the mouse movement is visually fed back to  
20 the user by a graphic symbol or cursor displayed on the  
computer screen that copies the mouse movement creating the

illusion in the mind of user of directly moving it with the user's hand. The application program derives user commands according to spatial relationships between the displayed information and the cursor position on the screen when a 5 switch is activated (usually in the form of a push-button or similar means) provided on top of the mouse for generating binary (i.e., on-off) control information.

[1004] The capability of the mouse to generate position signals plus one or more binary control signals with just 10 one hand of the user has turned the mouse into a most useful tool for interactive computer program control. Its flexibility when used in combination with graphic programs, either graphic applications themselves or using the graphics capacity of the computer as an interactive user- 15 machine interface, made this instrument a very popular input device, mostly for personal computer applications.

[1005] Popular applications include computer games, presentation and processing software, and Internet browsing, sometimes referred to as "web surfing". However, 20 in most of these applications, additional inputs in the form of alphanumeric information need to be provided to complete the task. For example, while browsing the

Internet, the user may highlight and select items in the visual display by moving the mouse and clicking the button. Further, the user may also need to enter alphanumeric information to provide Internet address or to supply other 5 pertinent information. For another example, the user may need to enter alphanumeric information, such as target information, while playing an interactive game.

[1006] Accordingly, the user needs to move the mouse with one hand to place a cursor on a desired location of the 10 display, click the mouse button to select or highlight item(s) on the display, take the hand off the mouse, and enter the alphanumeric information on the keyboard with two hands. In normal operation of the application, this situation can arise repeatedly forcing the user to separate 15 or decouple the selection task from the alphanumeric input task. This can create cumbersome and undesirable situation where the user's hands and arms are in a continuous back and forth movement between the mouse and the keyboard.

[1007] Prior attempts have been made to address this 20 problem by providing a keyboard with a small transducer/actuator, such as a track ball or touch pad, coupled to the surface of the keyboard. However, these

solutions still do not fully address the need to significantly reduce the decoupling of the above-mentioned tasks. Furthermore, the small size of the transducer/actuator necessitates the use of a finger rather than a hand to move the cursor, which adversely increases sensitivity and thus decreases precision movement of the cursor.

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[1008] Accordingly there is a need for a mouse or mouse-like device that enables entry of a plurality of functions directly from the mouse or mouse-like device.

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## **SUMMARY**

[1009] A mouse device for providing a plurality of functions as a computer input on a display comprises a first input element, at least one selection element, and a second input element. The first input element is configured to generate position signals of a cursor on the display in response to movement of the first input element. The selection element is configured to enable selection of at least one item on the display. The second input element is configured to generate signals providing alphanumeric input capability.

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**BRIEF DESCRIPTION OF THE DRAWINGS**

[1010] Different aspects of the disclosure will be described in reference to the accompanying drawings.

5 [1011] Figure 1 illustrates a top view of a mouse device in accordance with an embodiment.

[1012] Figure 2 illustrates a top view of a mouse device in accordance with an alternative embodiment.

10 [1013] Figure 3 illustrates a top view of a mouse device in accordance with another embodiment.

[1014] Figure 4 illustrates a top view of a mouse device in accordance with yet another embodiment.

[1015] Figure 5 illustrates a top view of a mouse device in accordance with yet another embodiment.

15 [1016] Figure 6 illustrates a side view of the mouse device illustrated in Figure 5.

[1017] Figure 7 illustrates the other side view of the mouse device illustrated in Figure 5.

20 [1018] Figure 8 illustrates a top view of a mouse device in accordance with a further embodiment.

## DETAILED DESCRIPTION

[1019] To meet the above-described need for a mouse device that enables entry of a plurality of functions directly from the mouse device, exemplary embodiments are described 5 for a compact mouse device. The exemplary mouse device allows the user to enter several functions, including pointing, selecting, and inputting alphanumeric information, with only a single hand, which is normally used to control the mouse device for pointing and/or 10 selecting function only. It should be understood that references to the mouse device also includes other mouse-like devices.

[1020] Figure 1 illustrates a top view of a mouse device 100 in accordance with an exemplary embodiment of the 15 present invention. The mouse device 100 includes a housing 102 that can be operated by a single hand over a flat surface 106 to generate signals in response to the relative motion of the housing 102 over the flat surface 106. These signals are produced by a transducer or optical generator 20 (not shown) located on the bottom of the housing 102, and are transmitted to a computer via communication means, such as a cable 104 connected to a computer's input port. In

some configuration, the communication means can be a communication medium enabling wireless transmission of the signals. The signals represent orthogonal incremental motion components of the mouse 102 in x and y directions 5 over the flat surface 106.

[1021] The exemplary mouse device 100 also includes push-button switches 108, 110, which allow user commands to be communicated to the computer according to spatial relationships between the displayed information and the 10 cursor position on the screen when the switch 108 or 110 is activated.

[1022] In accordance with the exemplary embodiment, the mouse device 100 further includes an alphanumeric keypad 120 disposed on top of the housing 102. The illustrated 15 alphanumeric keypad 120 is similar in configuration and usage as keypads used in cellphones or other wireless communication devices. However, the layout of the keypad 120 can be modified to suit the needs for a particular usage. For example, unlike cellphone keypads, the "1" key 20 122 on the top left corner of the keypad 120 includes a period, a hyphen, and a colon, which are often used in entering Internet addresses. Furthermore, the keys 124,

126 include 'Enter' and 'Space' commonly used in entering  
phrases or sentences.

[1023] The exemplary mouse device 100 can provide all of  
the desired input symbols and signals for many graphical  
5 and/or interactive programs normally interfaced with a  
combination of conventional keyboard and mouse. Thus,  
means for providing inputs to the graphical and/or  
interactive programs is included in the exemplary mouse  
device 100. The desired inputs can be entered through the  
10 exemplary mouse device 100 with one hand using relatively  
small space, or almost no space if the mouse device 100 can  
be converted into a handheld remote device.

[1024] Figure 2 illustrates a top view of a mouse device  
200 in accordance with an alternative embodiment. In the  
15 alternative embodiment, the mouse device 200 further  
includes a 'Space' button 202, a 'Delete' button 204, and  
an 'Enter' button 206. These buttons 202, 204, 206 provide  
functions commonly used in entering alphanumeric inputs.

[1025] Figure 3 illustrates a top view of a mouse device  
20 300 in accordance with another embodiment. This embodiment  
shows further configurations that provide additional  
functions for entering alphanumeric inputs. The additional

functions facilitate the efficient entry of alphanumeric inputs. Similar to the embodiment shown in Figure 2, buttons 302, 312, 314 provide 'Delete', 'Space', and 'Enter' functions, respectively.

5 [1026] In the illustrated embodiment of Figure 3, buttons 304, 306, 308, and 310 can be used to enable relatively quick and efficient entry of the alphanumeric inputs. For example, to enter the word 'kin' using the conventional method employed in most cellphones would require three presses of '5' button, four presses of '4' button, and 10 three presses of '6' button, for a total of ten presses. However, using the buttons 304-310, the same word 'kin' can be entered by simultaneously pressing buttons 308 and '5', followed by buttons 310 and '4', followed by 308 and '6', for a total of three simultaneous button presses.

15 [1027] The embodiment of Figure 3 also illustrates a scroll wheel 320, which can be used to scroll the view screen without having to click the scroll bar. The scroll wheel 320 can also be used to quickly select an alphanumeric entry. For example, the word 'kin' can be entered by 20 pressing '5' button and moving the scroll wheel until the entry at the cursor shows the letter 'k'. When the entry

at the cursor show the letter 'k', the '5' button can be released to select the letter 'k'. This process can be repeated for '4' button and '6' button until letters 'i' and 'n', respectively, are selected. The use of the scroll 5 wheel 320 eliminates the need for buttons 304-310.

[1028] Figure 4 illustrates a top view of a mouse device 400 in accordance with yet another embodiment. This embodiment shows further configurations that provide additional functions and features. The additional features 10 include a text display monitor 402 that displays the input being entered on the keypad 404. The features also include a button 406 that recalls the last entry made with the keypad 404. The button 406 can be repeatedly pushed to recall further prior entries.

15 [1029] Figure 5 illustrates a top view of a mouse device 500 in accordance with yet another embodiment. The illustrated embodiment includes additional buttons 502, 504, 506, 508, which may be used in interactive situations.

[1030] For example, Figure 6 and Figure 7 show left and 20 right side views of the mouse device 500. In the side views of the mouse device 500, the buttons 502 and 504 are used to move the cursor up, down, left, and right. The

buttons 506, 508 are used for 'Cap' and 'Function/Menu' input. Thus, these buttons 502, 504 can be used in an interactive game or other processing situation.

[1031] Figure 8 illustrates a top view of a mouse device 800 in accordance with a further embodiment. This embodiment shows a variation of the embodiment shown in Figure 4, where the text display monitor 402 is disposed above mouse buttons 804, 806 to display the text being entered without being blocked by the user's hand.

[1032] The advantages of the above-described exemplary embodiments include significant reduction in repetitive movements of hand and arm between the mouse and the keyboard and the possible reduction in the space required for work. For example, in a tight workspace, such as on an airplane, use of the compact mouse device 100, 200, 300, 400, 500, or 800 can eliminate the requirement for a keyboard.

[1033] While specific embodiments of the invention have been illustrated and described, other embodiments and variations are possible. Although only a limited number of operational examples of the compact mouse device have been described, other similar operational uses of the mouse

device are contemplated. For example, the compact mouse device 100, 200, 300, 400, 500, or 800 can be configured as a handheld remote control device similar to a remote control device described in a co-pending U.S. Patent

5 Application entitled "Remote Control Device Capable of Sensing Motion", Attorney Docket No. 12345/002001, filed August xx, 2003, and assigned to a common assignee. In this configuration, the compact mouse device would be configured as a handheld device with a motion sensors

10 rather than a conventional mechanical x-y position sensor located at the bottom of the mouse device.

[1034] All these are intended to be encompassed by the following claims.